UNITED STATES PATENT AND TRADEMARK OFFICE

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10/684,690	10/14/2003	Xiaohua Shi	INTEL/17586	3406

7590 11/28/2006		EXAMINER
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Chicago, IL 60606-6357	2193

DATE MAILED: 11/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>24 August 2006</u>.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-25</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-25</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>17 November 2003</u> is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____.

        3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claims 1 – 25 have been examined.

Claims 20 and 25 have been amended.

Drawings

1.   The drawings filed November 17, 2003 have been accepted.

Specification

2.   The new title of the invention has been entered.

Claim Rejections - 35 USC § 101

3.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4.   Claims 1 - 25 are rejected under 35 U.S.C. 101 because the claimed invention is directed

to non-statutory subject matter. The current focus of the Patent Office in regard to statutory

inventions under 35 U.S.C. § 101 for method claims and claims that recite a judicial exception

(software) is that the claimed invention recite a practical application. Practical application can

be provided by a physical transformation or a useful, concrete and tangible result. No physical

transformation is recited and additionally, the final result of the claim is escape analysis which is

not a tangible result because the end result of the escape analysis is not claimed to be tangible.

The following link on the World Wide Web is for the United States Patent And Trademark

Office (USPTO) policy on 35 U.S.C. §101.

   http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines101_20051026.pdf

   See response to arguments below.

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6.   Claim rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Previously the Examiner had interpreted claim 19 and 25 to be performing escape analysis. The amendment makes it unclear exactly what the Applicant is updating. The claim should be clear and concise. This amendment was reviewed to determine if it would overcome the rejection under 35 U.S.C. § 101, but the claim is indefinite as to "update the escape analysis of the application." The amendment introduces indefiniteness to the claim.

Claim 25
A processor system as defined in claim 20, wherein the processor is to update the escape analysis of the application.   -

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   Claims 1 – 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Compositional Pointer and Escape Analysis for Java Programs, John Whaley et al, 1999, ACM (ESC) in view of "Effective Synchronization Removal for Java", Erik Ruf, ACM, 2000 (IDS).

Claim 1

ESC teaches a method to analyze escape analysis of an application comprising: identifying one or more methods associated with a violating condition (ESC, page 192, section 3.3); parsing the one or more methods into at least one equivalence class (IDS, page 209 section 2.2 - the Directed Acyclic Graphs are proof of parsing they are the result and required for section 3.3.2); identifying a first escape indicator and a second escape indicator associated with each of the at least one equivalence class (IDS, as per above); and propagating the one or more methods based on the first and second escape indicators (ESC, as per above). ESC teaches escape pointer analysis for JAVA, where the program prepares for an early exit. What ESC does not explicitly mention is the well known transformation for optimization known as equivalence. It is IDS who teaches the well known optimization technique in the context of Java. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine ESC and IDS because equivalence optimization is a low level optimization technique and will result in making programs that prepare for the encountering of an escape more efficient.

Claim 2

A method as defined in claim 1, wherein identifying the one or more methods associated with the violating condition comprises identifying at least one of a new method, an additional method, and a method associated with a change in a recursive call chain (ESC, page 190, section 2.3).

Claim 3

A method as defined in claim 1, wherein identifying the one or more methods associated with the violating condition comprises identifying one or more methods associated with at least one of dynamic class loading, native method, and reflection (ESC, page 202, Dynamic classloading result of classes produced by Jalapeno).

Claim 4

A method as defined in claim 1, wherein identifying the one or more methods associated with the violating condition comprises identifying the one or more methods during runtime of the application. (ESC, page 192, section 3.3).

Claim 5

A method as defined in claim 1, wherein identifying the first escape indicator and the second escape indicator associated with each of the at least one class comprises identifying a bottom-up escape status flag and a top-down escape status flag. (ESC, page 18, section 1.3, required for edges of the graph – how to plan to escape from a segment (basic block) of code).

Claim 6

A method as defined in claim 1, further comprising updating the escape analysis of the application. (Inherent – while the program runs the program lookup table is the possible paths traversing the DAG and the conditions of the code control the actual course of the program. Escapes interrupt that course and must be updated same as the current course of the program).

Claim 7
A machine readable medium storing instructions, which when executed, cause a machine to: identify one or more methods associated with a violating condition; parse the one or more methods into at least one equivalence class; identify a first escape indicator and a second escape indicator associated with each of the at least one class; and propagate the one or more methods based on the first and second escape indicators. As per claim 1.

Claim 8
A machine readable medium as defined in claim 7, wherein the instructions cause the machine to identify the one or more methods associated with the violating condition by identifying at least one of a new method, an additional method, and a method associated with a change in a recursive call chain. As per claim 2.

Claim 9
A machine readable medium as defined in claim 7, wherein the instructions cause the machine to identify the one or more methods associated with the violating condition by identifying one or more methods associated with at least one of dynamic class loading, native method, and reflection. As per claim 3.

Claim 10
A machine readable medium as defined in claim 7, wherein the instructions cause the machine to identify the one or more methods associated with the violating condition by identifying the one or more methods during runtime of the application. As per claim 4.

Claim 11
A machine readable medium as defined in claim 7, wherein the instructions cause the machine identify the first escape indicator and the second escape indicator associated with each of the at least one class by identifying a bottom-up escape status flag and a top-down escape status flag. As per claim 5.

Claim 12
A machine readable medium as defined in claim 7, further comprising instructions, which when executed, cause the machine to update the escape analysis of the application. As per claim 6.

Claim 13
A machine readable medium as defined in claim 7, wherein the machine readable medium comprises one of a programmable gate array, an application specific integrated circuit, an erasable programmable read only memory, a read only memory, random access memory, a magnetic media, and an optical media. (JAVA running in the RAM environment required for the techniques disclosed in both ESC and IDS).

Claim 14
An apparatus to analyze escape analysis of an application comprising: a method identifier configured to identify one or more methods associated with a violating condition; a method

parser coupled to the method identifier and configured to parse the one or more methods into at least one class; a status identifier coupled to the method parser and configured to identify a first status indicator and a second status indicator associated with the least one class; and a compiler coupled to the status identifier and configured to propagate the one or more methods based on the first and second status indicators. As per claim 1.

Claim 15
An apparatus as defined in claim 14, wherein one or more methods associated with a violating condition comprises at least one of a new method, an additional method, and a method associated with a change in a recursive call chain. As per claim 2.

Claim 16
An apparatus as defined in claim 14, wherein the violating condition comprises at least one of dynamic class loading, native method, and reflection. As per claim 3.

Claim 17
An apparatus as defined in claim 14, wherein the first escape indicator comprises a bottom-up escape status flag. As per claim 4.

Claim 18
An apparatus as defined in claim 14, wherein the second escape indicator comprises a top-down escape status flag. As per claim 5.

Claim 19
An apparatus as defined in claim 14, wherein the compiler is configured to update the escape analysis of the application. As per claim 6.

Claim 20
A processor system to analyze escape analysis of an application comprising: a dynamic random access memory (DRAM) configured to store one or more methods of the application and ;
a processor operatively coupled to the DRAM, the processor to identify the one or more methods associated with the violating condition; to parse the one or more methods into at least one equivalence class, to identify a first escape indicator and a second escape indicator associated with each of the at least one class; and to propagate the one or more methods based on the first and second escape indicators. As per claim 1.

Claim 21
A processor system as defined in claim 20, wherein the one or more methods associated with a violating condition comprises at least one of a new method, an additional method, and a method associated with a change in a recursive call chain. As per claim 2.

Claim 22
A processor system as defined in claim 20, wherein the violating condition comprises at least one of dynamic class loading, native method, and reflection. As per claim 3.

Claim 23
A processor system as defined in claim 20, wherein the first escape indicator comprises a
bottom-up escape status flag. As per claim 4.

Claim 24
A processor system as defined in claim 20, wherein the second escape indicator comprises a top-
down escape status flag. As per claim 5.

Claim 25
A processor system as defined in claim 20, wherein the processor is to update the escape analysis
of the application. As per claim 6.

Response to Arguments

I. REMARKS
Applicant's Remarks
"The applicants have carefully considered the official action dated June 28, 2006, and
the references it cites. In the official action, the abstract was objected to for allegedly using
legal words, the title was objected to as non-descriptive, claims 1-25 were rejected under 35
U.S.C. 101 as allegedly directed to non-statutory subject matter, and claims 1-25 were
rejected under 35 U.S.C. 103(a) as unpatentable over "Compositional Pointer and Escape
Analysis for Java Programs" by John Whaley 'and Martin Rinard ("Whaley"), in view of
"Effective Synchronization Removal for Java" by Erik Ruf ("Ruf ').

By way of this response, claims 20 and 25 have been amended leaving claims 1-25
pending in this application, of which claims 1, 7, 14, and 20 are independent. In view of the
foregoing amendments and the following remarks, the applicants respectfully traverse the
outstanding rejections and respectfully submit that all pending claims are in condition for
allowance. Favorable reconsideration is respectfully requested.

Turning to the objection to the abstract, the examiner directs the applicants to MPEP
§608.01(b) for further clarification of proper abstract practice. In particular, MPEP
§608.01(b)(C) instructs applicants to avoid legal phraseology and recites the terms "means" and
"said" as such exemplary phraseology. Moreover, MPEP §608.01(b)(E) provides applicants with
sample abstracts, which explicitly employ the term "method." Accordingly, the applicants
respectfully submit that the term "method" is not legal phraseology intended to be avoided by
MPEP §608.01(b)(C). The applicants also respectfully submit that the terms "apparatus" and
"method" are complimentary terms appropriately used to enable the reader to quickly determine
the nature and gist of the disclosure, as envisioned by MPEP § 608.01(b)(A)."
Examiner's Response

It does not matter if the Applicant and Examiner agree or disagree on the issue of the words in the Abstract, being legal words and not descriptive. Examiner in such a situation can not alter the Abstract.

Applicant's Remarks

"Turning to the objection to the title, applicants have amended the title as "Escape Analysis of an Application Using Escape Indicators.""
Examiner's Response
New title has been entered.

II. The Rejections Under 35 U.S.C. § 101
Applicant's Statements
Turning to the rejection under 35 U.S.C. § 101, the applicants respectfully maintain that rejected claims 1-25 are directed to statutory subject matter. As a preliminary matter, the applicants wish to thank examiner Ingberg for the United States Patent and Trademark Office (USPTO) guidelines regarding 35 U.S.C. § 101 by providing the link to "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility," found on the World Wide Web at www. uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines10120051026.pdf ("Guidelines").
Examiner's Response
The Paragraph use is that of the Office.

Applicant's Statements
"A. Claims 1-25 Are Directed To Subject Matter That Involves a Physical Transformation
The applicants maintain that a claim directed to a practical application constitutes statutory subject matter if it involves a physical transformation or if it produces a useful, tangible, and concrete result, but in neither case preempts an abstract idea, a law of nature, or a natural phenomenon. Diamond v. Diehr, 450 U.S. 175, 183-184, 187, and 192 (U.S. 1981); State St. Bank & Trust Co. v. Signature Fin. Group, 149 F.3d 1368, 1373 (Fed. Cir. 1998). In particular, claims 1-25 are directed to subject matter that involves a physical transformation. The use of mathematical calculations to derive a value having a non-abstract and "specific meaning" constitutes a physical transformation. Arrhythmia Research Technology, Inc. v. Corazonix Corp., 958 F.2d 1053, 1060 (Fed. Cir. 1992); Slate St. Bank & Trust Co., 149 F.3d at 1373.

In Arrhythmia Research Technology, Inc., a process claim recited, inter alia, converting signals to digital values, applying the digital values to a particular operation, determining an arithmetic value of the amplitude of an output, and comparing the arithmetic value to another value. 958 F.2d at 1055. Transforming electrical signals to a non-abstract, arithmetic value having a particular meaning indicative of a person's heart activity constituted a physical transformation. Id. The Federal Circuit has also held that using a mathematical process to derive a final share price from data representing dollar amounts constitutes a physical transformation. State St. Bank & Trust Co., 149 F.3d at 1373.

Claims 1-25 are directed to, inter alia, a method to analyze escape analysis of an application comprising identifying a first escape indicator and a second escape indicator associated with each of the at least one equivalence class. The resulting analysis of the escape

analysis, itself, constitutes more than a mere abstract value. Generally speaking, identifying a first escape indicator and a second escape indicator associated with each of the at least one equivalence class allows for the determination of reference variables with lesser concern that an escape status of a caller method influences other caller methods. Moreover, claims 1-25 also recite, inter alia, propagating the one or more methods based on the first and second escape indicators. As such, the aforementioned method to analyze escape analysis of an application is not an abstract result because it affects synchronization operations. See AT&T Corp., 172 F.3d at 1358 (holding that a value indicative of a call recipient's primary interexchange carrier ("PIC") was not abstract because it facilitated implementing a subscriber billing process)."

Examiner's Response

The current policy is directed toward concrete useful and tangible. Tangible is the issue in the rejection.

Claim 1 – the method claim does not recite the need to perform the limitations on a computer. The analysis must be more than a calculation or determination. The limitation propagate does not specify the propagation is being performed to a computer readable medium. In fact this limitation in many of the claims could easily be amended to overcome the rejection.

Claim 7, Claim 14 apparatus, Claim 20 a processor system, have a medium computer readable medium present, but do not clearly state the propagation is storing on the medium.

For these reasons the independent claims do not comply with current Office policy.

Applicant's Statements

"B. Claims 1-25 Produce a Useful, Concrete, and Tangible Result

However, even if claims 1-25 did not involve a physical transformation, those claims would not necessarily constitute non-statutory subject matter. AT&T Corp. v. Excel Communs., Inc., 172 F.3d 1352, 1358-1359 (Fed. Cir. 1999). In AT&T Corp., the Federal Circuit clarified that a physical transformation is merely an example indicative of statutory subject matter. Id. at 1359. Accordingly, even if claims 1-25 do not include a physical transformation, the claims constitute statutory subject matter because they produce a useful, concrete, and tangible result and they do not preempt an abstract idea, a law of nature, or a natural phenomenon. In particular, a claimed invention that produces a number shall not necessarily be deemed as not producing a useful, concrete, and tangible result. State St. Bank & Trust Co., 149 F.3d at 1373. On the contrary, a mathematical algorithm reduced to a practical application constitutes a useful, concrete, and tangible result. Id.; see also AT&T Corp., 172 F.3d at 1356 ("the judicially-defined proscription against patenting of a `mathematical algorithm,' to the extent such a proscription still exits, is narrowly limited to mathematical algorithms in the abstract.").

In State St. Bank & Trust Co., the claimed invention recited a mathematical algorithm used to transform data corresponding to dollar amounts to a final share price. Id. at 1373. The final share price was a useful, concrete, and tangible result because it was generated for subsequent use and was relied upon for further processes. Id. (explaining that "the final share price [was] momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades").

Independent claims 1, 7, 14, and 20 of the subject application involve, inter alia, identifying a first escape indicator and a second escape indicator associated with each of the

at least one equivalence class, and propagating the one or more methods based on the first and second escape indicators. The resulting analysis improves the technique to eliminate unnecessary synchronization operations. Thus, the claimed subject matter is not an abstract idea but, instead, constitutes a useful, concrete, and tangible result having a practical application."

Examiner's Response

Under current Office policy the independent claims fail to comply as described above. In terms of case claw the Office Policy states they have taken case law into consideration when determining the policy.

Useful, Concrete and Tangible in view of the claim limitations. In order for the claimed invention to be activated the presence of a trigger condition must be present in one or more methods leading to at least to escapes must be present. If these conditions are not present the *only* thing the claimed invention did was perform analysis. The following are posed as questions: Was it .... ?

Useful – Sure the presence of analysis that never triggers is still useful.

Concrete – Sure the claimed invention will run the same every time it is deterministic.

Tangible – NO nothing would be updated if it is not triggered. The other arguments assume the conditions to trigger the invention are present. The current claimed invention does not clearly and concisely ensure the conditions are triggered just checking to see if they are present.

Applicant's Statements

"Additionally, the official action appears to suggest that a tangible result would be evident if the claim were embodied in a computer readable medium. [See official action, pages 2 and 3]. However, if determining statutory subject matter is merely based on whether the claim recites a method or a machine readable medium, then claims 7-13 would certainly qualify as statutory subject matter (i.e., claims 7-13 are directed to a machine readable medium storing instructions).

Examiner's Response

The current Office policy is on a result being tangibly embodied in the claimed. The fact that claims 7-13 recite "embodied in a computer readable medium", does not guarantee the result will be written, stored, updated or displayed etc on a computer readable medium. Claim language fails to comply with current Office policy. And the mere presence of a medium does not mean it is storing, updating, writing or displaying unless it is claimed.

Applicant's Statements

"While the applicants employ substantive case law to determine and argue that claims 1-25 recite statutory subject matter, the applicants respectfully request further clarification of applicable persuasive case law, if any, that may further explain how a claim is deemed to illustrate a tangible result merely by virtue of its embodiment on a computer readable medium, as suggested in the official action on pages 2 and 3. As identified by the Guidelines provided by the examiner, the USPTO has a burden to set forth a prima facie case of unpatentability and provide an explanation why the subject matter falls outside all the statutory categories. However, the applicant cannot reasonably respond to the official action in view of alleged reasons of non-

statutory subject matter that appear to directly conflict with both Federal Circuit case law and the Guidelines."

Examiner's Response

Despite if the applicant feels they *"cannot reasonably respond to the official action in view of alleged reasons of non-statutory subject matter that appear to directly conflict with both Federal Circuit case law and the Guidelines. "*, as stated in the response the response is deemed a bona fide attempt to respond. Applicant's arguments are not persuasive.

III. The Rejections Under 35 U.S.C. § 103(a)
Applicant's Statements
"Turning to the art rejections, the applicants respectfully submit that independent claims 1, 7, 14, and 20 are allowable over Whaley, alone or in combination with Ruf. Independent claims 1, 7, 14, and 20 are directed to methods, apparatus, systems, and machine readable media storing instruction that, inter alia, identify a first escape indicator and a second escape indicator associated with each of the at least one equivalence class, and propagate the one or more methods based on the first and second escape indicators. None of the cited references teaches or suggests identifying a first escape indicator and a second escape indicator associated with each of the at least one equivalence class, and propagating the one or more methods based on the first and second escape indicators, as recited in claims 1, 7, 14, and 20."

Examiner's Response
As stated above the claimed invention performs analysis with the function of identifying and no guarantee the events are present. This was emphasized above in response to arguments about the rejection under 35 U.S.C. 101. Claim 1 is presented below:

Claim 1

a method to analyze escape analysis of an application comprising: identifying one or more methods associated with a violating condition; parsing the one or more methods into at least one equivalence class; identifying a first escape indicator and a second escape indicator associated with each of the at least one equivalence class; and propagating the one or more methods based on the first and second escape indicators

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the actual triggering of the conditions the invention is attempting to identify. Identifying in the context of the claims is only a monitor function where it is running looking for events to cause the other limitations to be relevant) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Claimed invention is not clearly and concisely claimed and fails to support the arguments.

Applicant's Statements
"Whaley teaches, inter alia, escape analysis generally and points-to escape graphs that characterize how local variables in objects refer to other objects. [Whaley, Abstract, § 1 page 187, § 1.1 page 187]. Whaley also teaches implementations to eliminate synchronization and, for the sake of efficiency, object allocation on a stack rather that a heap. [Whaley, Abstract, § 1.1 page 187]. However, Whaley's system is designed to analyze each method independently of its callers and, when analysis is performed, with respect to arbitrary regions of programs. [Whaley, § 1.2 page 188, § 1.3 page 188]. Consequently, Whaley acknowledges that the analysis result becomes more precise as more of the invoked methods are analyzed, but fails to teach or suggest identifying a first escape indicator and a second escape indicator associated with each of the at least one equivalence class, and propagating the one or more methods based on the first and second escape indicators, as recited in independent claims 1, 7, 14, and 20. [Whaley, §1.2 page 188]."

Examiner's Response

Whaley's use of escape graphs for a different purpose than the Applicant's is not a distinguishing limitation nor clearly and concisely distinguished by the present claim limitations.

Applicant's Statements

"The examiner acknowledges, on page 3 of the official action, that Whaley does not teach equivalence. Accordingly, Whaley does not, and cannot teach identifying a first escape indicator and a second escape indicator, much less those associated with each of the at least one equivalence class. Furthermore, absent a first and second escape indicator associated with each of the at least one equivalence class, Whaley cannot teach propagating the one or more methods based on the first and second escape indicators.

Examiner's Response

The actual official office action states equivalence is not explicitly taught. And mentions equivalence is well known. The following is from the Official Office Action: "*ESC teaches escape pointer analysis for JAVA, where the program prepares for an early exit. What ESC does not explicitly mention is the well known transformation for optimization known as equivalence. It is IDS who teaches the well known optimization technique in the context of Java. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine ESC and IDS because equivalence optimization is a low level optimization technique and will result in making programs that prepare for the encountering of an escape more efficient.*"

For how well known equivalence is the Examiner has added old teachings dating back to the 1970s – 1985, see prior art made of record.

Applicant's Statements

"The official action appears to contend that Ruf overcomes the deficiencies of Whaley by teaching identifying a first escape indicator and a second escape indicator associated with each of the at least one equivalence class. On the contrary, Ruf teaches, inter alia, a technique for removing unnecessary synchronization operations from Java programs and employs equivalence based representations and "points-to" relationships for optimization in a flow-insensitive manner. [Ruf, Abstract, § 1 page 209, §2.2 page 209]. In fact, unlike identifying a first escape indicator and a second escape indicator and propagating the one or more methods based on the first and second escape indicators, as recited in the independent claims, Ruf seeks convenience, efficiency, and minimized analysis time at the expense of precision. [Ruf, § 1 and §2.2 page 209]. Rather than propagating the one or more methods based on the first and second escape indicators, Ruf describes the flow-insensitive manner of optimization and expounds upon representations constructed in a single pass and giving up flow directionality. [Ruf, § 1 and §2.2 page 209].

As a result, because neither Whaley nor Ruf teach or suggest identifying a first escape indicator and a second escape indicator associated with each of the at least one equivalence class, and propagating the one or more methods based on the first and second escape indicators, neither Whaley nor Ruf, alone or in combination, render independent claims 1, 7, 14, and 20 obvious. Accordingly, the rejection of claims 1, 7, 14, and 20, and all claims dependent thereon, must be withdrawn for at least the foregoing reasons."

Examiner's Response

The rejection is a combination where Whaley teaches escape analysis for JAVA. JAVA being well known to be a programming language. The Applicant points away to the second bullet on page 187 of the Whaley reference, when the first states

- It is an interprocedural analysis. It is designed to combine analysis results from multiple methods to obtain precise point-to and escape analysis.

The invention as disclosed between pages 7 – 9 also is based on interprocedural analysis. Even if Ruf's has a different motivation and affect the current claim limitations do not distinguish over the combination of Whaley and Ruf and further highlight the unclaimed invention.

Conclusion

9.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

A. JAVA!, by Richey – one for the first text books on the programming language JAVA

published September 22, 1995. Page dynamic linker class is by definition part of the

programming language JAVA.

B. Aho et al common college text book for Compiler theory. Three generations of the book

coving the topic of equivalence from the 1970s to 1985.

10.   Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

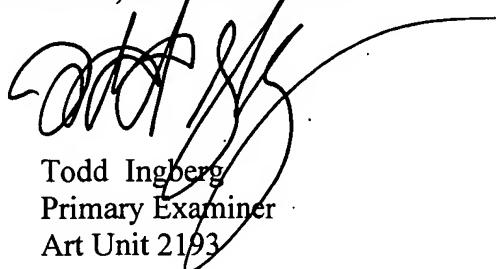CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this

final action.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Todd Ingberg whose telephone number is (571) 272-3723. The

examiner can normally be reached on during the work week..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

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